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Self-reported eye health in Canada: 20 years of data

by Philippe Finès

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Self-reported eye health in Canada: 20 years of data

by *Philippe Finès*

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ABSTRACT

Context

Eye health is an indicator of health in general. Few studies on eye health have been done in Canada, and none of them covered several years of data.

Data and methods

Data from the Canadian Community Health Survey for most years from 2000 to 2020 were used. Eye health was analyzed, by year, sex and age, as well as by immigrant status, the highest level of education in the household and the income quintile of the household. Estimates were obtained using survey weights, and 95% confidence intervals were obtained with bootstrap weights.

Results

In 2020, the proportion of the population that reported having good vision without correction was about 75% among youth aged 12 to 19 years for both sexes. This proportion was considerably lower for those aged around 45 to 49 years and was about 25% for those aged 55 years or older. Self-reported good vision without correction improved from 2000/2001 to 2020, except for those aged 20 to 39 years old. Every year, fewer females than males reported having good vision without correction.

Interpretation

Self-reported eye health generally improved during the period of this study. Limitations of the survey arise from the fact that it uses self-reported data. Moreover, the survey underwent important changes in 2015 that could limit the comparability of data during the period of the study. However, the large number of years included in the study and the stability of the results validate the conclusions.

Keywords

Canadian Community Health Survey; Health Utilities Index Mark 3; Multi-cycle study; Vision; Visual impairment

AUTHOR

Philippe Finès is with the Health Analysis Division, Analytical Studies and Modelling Branch, Statistics Canada.

What is already known on this subject?

- Eye health is an indicator of general health.
- Few studies on eye health have been done in Canada, and they did not cover several years of data.

What does this study add?

- The percentage of the population with self-reported good vision without correction
 - decreased by age, with the largest decrease observed in those aged 40 to 55 years
 - was less frequent among females than males
 - was higher in 2020 compared with 2000/2001, except among those aged 20 to 39 years
 - did not vary in any evident way with immigrant status, education or income quintile.

Eye health is an indicator of health in general and of quality of life in particular.¹ For example, diabetes,² hypertension³ or neurological disease⁴ can be detected based on eye health. A comprehensive eye examination, with the advantage of being non-invasive, may therefore suggest diseases that might later be confirmed through a more specific examination. It is also known that there is a correlation between eye health and income,⁵ as they share a two-way relationship: bad eye health impacts economic status and vice versa.

In Canada, few studies on eye health have been done. Millar⁶ used data from the National Population Health Survey and the Canadian Community Health Survey (CCHS) in 2003 on the population aged 65 years and older. He found that 82% of this population had vision problems and 4% had uncorrected problems. Jin and Thorpe⁷ used CCHS data from 2005 to analyze the utilization of eye care providers. One conclusion they drew was that “marked disparities occur in eye care utilization among Canadians without known eye diseases.” A study by Aljied et al.⁸ on the Canadian Longitudinal Study on Aging (CLSA) showed that 86% of Canadians aged 45 to 85 years were wearing glasses or contact lenses and 6% were visually impaired, which is defined as binocular acuity of worse than 20/40. The data were collected from 2012 to 2015 in seven provinces.

Thus, the few studies that have been done in Canada on eye health had their own limitations regarding the respondents’ age or geographical coverage, or they have not been updated in many years. The objective of this study is to address this gap. More precisely, this study describes the changing trends of eye health from 2000 to 2020 by sex, age and other sociodemographic variables.

Data and methods

The CCHS is a cross-sectional survey that collects data on health status, health care and determinants of health. All CCHS

data are self-reported. The survey covers the Canadian household population aged 12 years or older. Members of the Armed Forces, institutional residents, residents of reserves and people living in some remote areas are not part of the target population. Coverage reaches 98% in the provinces, 97% in the Northwest Territories, 90% in Yukon and 71% in Nunavut.⁹

Data about eye health were collected in all Canadian provinces in the annual component of the CCHS during the following years: 2000/2001 combined (abbreviated as “2000” in the text), 2009, 2010, 2013, 2014, 2015, 2019 and 2020. Data were also available for the three territories during those years, except in 2015, 2019 and 2020. Sample sizes were 131,535; 61,679; 63,191; 64,346; 63,964; 51,545; 64,944; and 42,132, respectively.

Age (in years) was stratified in two ways:

- for general results, 12 to 19 years old, and then increasing in five-year intervals, from 20 to 24, 25 to 29, ... 70 to 74, 75 to 79 and 80 years or older
- for results by social determinants of health (see further), 12 to 29, 30 to 49, 50 to 69 and 70 years or older.

The Health Utilities Index Mark 3 (HUI3) is a self-reported indicator of health, consisting of eight components: vision, hearing, speech, ambulation, dexterity, emotion, cognition and pain.¹⁰ It is a generic measure based on preference that focuses on functional health. By construction, its values lie between -0.36 and 1, where 1 is for perfect health, 0 is for death and negative values are for states worse than death. The vision component of the HUI3 is an ordinal scale with six levels: 1 is for no visual problems, 2 is for problems corrected by lenses, 3 is for problems seeing from a distance—not corrected, 4 is for problems seeing up close—not corrected, 5 is for problems

seeing up close and from a distance—not corrected, and 6 is for no sight at all. In this study, the analyzed levels were

- level 1 (renamed “good vision without correction”)
- level 2 (renamed “corrected vision problem”)
- levels 3, 4 and 5 combined (as “uncorrected vision problem”).

These three new categories refer to eye health (based on the refractive error status), and therefore used as a synonym of that expression in this article. Level 6 was excluded because it was very rare (about 0.05%).

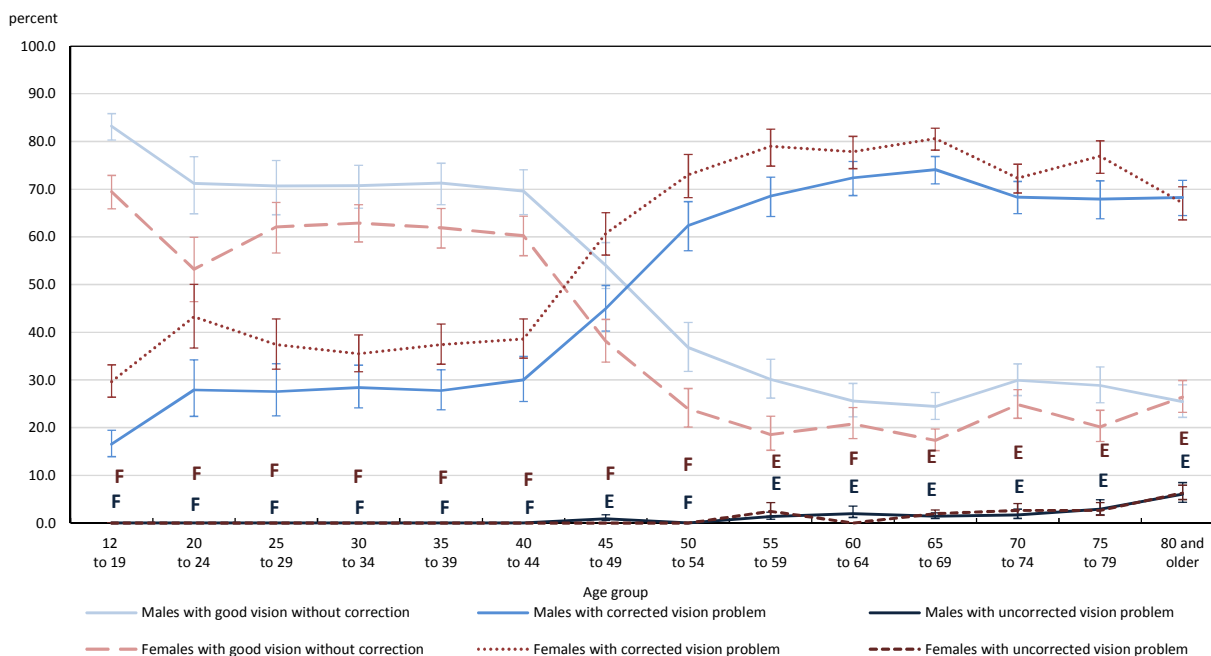
Three social determinants of health were considered in the study:

- Immigrant status had three categories: immigrated in the last 10 years (“recent immigrant”), immigrated 11 or more years ago (“established immigrant”) and non-immigrant. This variable was collected each year of the survey.
- The highest level of education in the household (abbreviated as “education”) was defined using a three-level scale: education lower than high school, high school diploma, and postsecondary education and diploma. This variable was collected each year of the survey.
- Household income was categorized into deciles according to provincial thresholds. Income was

collected every year, but deciles were calculated only starting in 2005. For this study, deciles were grouped into quintiles—the first quintile has the lowest income and the fifth quintile has the highest.

Results were produced with SAS software, version 9.4, and SAS-callable SUDAAN procedures, for all combinations of year, sex and age, globally and by social determinant of health. All estimates were obtained using survey weights, and 95% confidence intervals (CIs) were obtained using bootstrap weights. Estimates with a coefficient of variation (CV) higher than 16.6% and lower than or equal to 33.3% (the upper threshold was 33.3% in years before 2015 and 35.0% thereafter; to simplify, a common threshold of 33.3% was chosen for all years included in the study) are annotated with an “E” (use with caution). Estimates with a higher CV are not presented, but are noted as “F” (too unreliable to be published). Also, estimates obtained by a calculation from other estimates were noted as “E,” and the same was done for “F.” For all social determinants of health, the assessment of the change of trends on level of vision between first and last years of the study was done with a test on the difference between those two years. The assessment of a gradient effect for education was performed with two tests of comparison of consecutive levels: the gradient was defined as significant if both comparisons were significant.

Figure 1
Self-reported eye health by sex and age, household population aged 12 or older, Canada, 2020



F too unreliable to be published (the colour corresponds to the group)
E use with caution (the colour corresponds to the group)
Note: Vertical bars represent 95% confidence intervals.
Source: Canadian Community Health Survey, 2020.

Results

Age, sex and temporal trends

In 2020, the percentage of people with self-reported good vision without correction decreased with age. It went from 83% (CI of 80% to 86%) for males and 69% (CI of 66% to 73%) for females aged 12 to 19 years to approximately 70% for males and 60% for females aged 40 to 44 years, then down to about 25% for males and females in the oldest age group. This decreasing trend of good vision without correction by age was observed each year. The curve for the category of people with a corrected vision problem is almost a mirror copy of the one for people with good vision without correction, since the proportion of people with an uncorrected vision problem is negligible, except for the oldest age group, where it was about 6% for males and females (Figure 1).

Every year and for all age groups, the percentage of people with self-reported good vision without correction was lower for females than it was for males (the difference was at least 11, at most 14 and, on average, 9 percentage points). In 2020, that percentage was significantly lower (p-value of less than 0.04) than in 2000 for females aged 20 to 24 years. It was significantly higher for males starting at age 45 (all p-values of less than 0.0035) and for females starting at age 40 (all p-values of less than 0.005). It was not significantly different in the other age groups for either sex. See Figure 2, which shows the changing trend of this percentage from 2000 to 2020 for selected age groups (the other age groups are not shown for the sake of clarity).

Immigration

In 2020, the percentage of males with self-reported good vision without correction was similar between recent immigrants and non-immigrants for the two youngest age strata. For females, this was the case only for the youngest age stratum. No specific relationship between immigrant status and eye health was found (Figure 3).

For males aged 30 to 49 years, the percentage of people with self-reported good vision without correction was significantly higher (p-value of less than 0.003) in 2020 than in 2000, by approximately 4 percentage points among non-immigrants. For males aged 50 to 69 years, the percentage was significantly higher in 2020 compared with 2000 for each of the three categories of immigrant status. The increase was of 20 percentage points (p-value of less than 0.03) for recent immigrants, 9 percentage points (p-value of less than 0.003) for established immigrants and 10 percentage points (p-value of less than 0.001) for non-immigrants. For males aged 70 years or older, the results for recent immigrants were too unreliable to be published, but the percentage was significantly higher in 2020 compared with 2000 in the other two groups. There was an increase of 14 percentage points (p-value of less than 0.001) for established immigrants and 9 percentage points (p-value of less than 0.001) for non-immigrants. Finally, for males aged 12

to 29 years, no significant difference was found from 2000 to 2020.

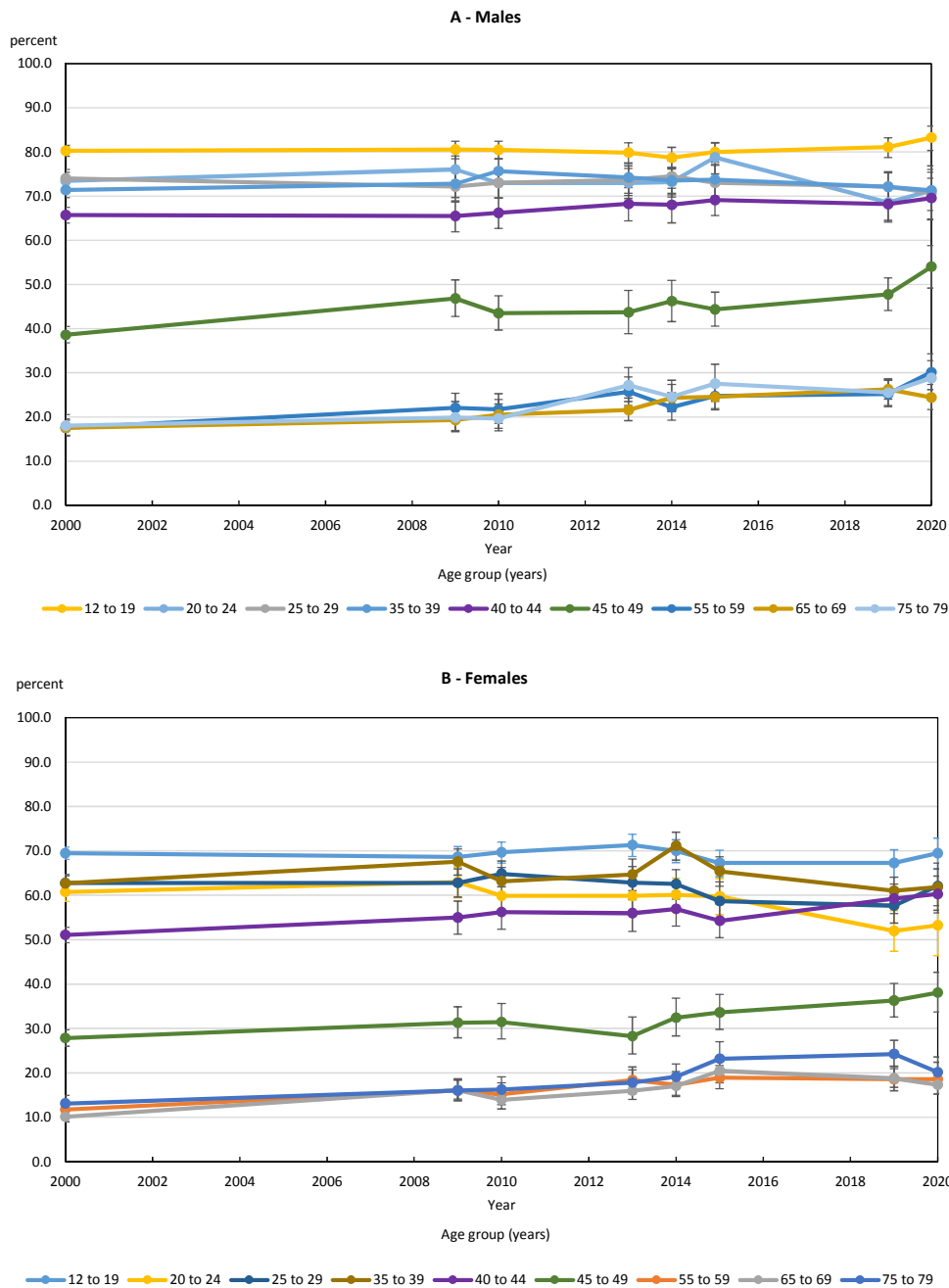
For females aged 12 to 29 years, no significant difference was found from 2000 to 2020. For females aged 30 to 49 years, the percentage of people with self-reported good vision without correction was significantly higher in 2020 than in 2000, by approximately 8 percentage points (p-value of less than 0.03) among established immigrants and 4 percentage points (p-value of less than 0.005) among non-immigrants. For females aged 50 to 69 years as well as 70 years and older, the results for recent immigrants were too unreliable to be published, but the percentage was significantly different in 2020 compared with 2000 for each of the other four groups. There was a difference of 8 percentage points (p-value of less than 0.003) for established immigrants aged 50 to 69 years, 7 percentage points (p-value of less than 0.001) for non-immigrants of same age stratum, 14 percentage points (p-value of less than 0.001) for established immigrants aged 70 years and older and 9 percentage points (p-value of less than 0.001) for non-immigrants of same age stratum.

Education

In 2020, the percentage of people with self-reported good vision without correction decreased with education level among males aged 12 to 29 years and 30 to 49 years, but increased with education among males and females aged 50 to 69 years and also slightly among females aged 70 years or older, but none of those gradients were significant. For the other sex-age groups, there was no clear relationship between education and eye health for both males and females (see Table 1).

There was no relationship between level of education and the *variation* of this percentage from 2000 to 2020. Only the significant variations from 2000 to 2020 mentioned here were observed. The difference in the percentage of people with good vision without correction from 2000 to 2020 was equal to about 11 percentage points on average for all education categories of both sexes in the oldest age stratum (all p-values of less than 0.001). Among males aged 50 to 69 years, the positive difference of about 11 percentage points on average from 2000 to 2020 was significant in the two highest education categories (both p-values of less than 0.001). For females of the same age stratum, households with a postsecondary education and diploma had the only observed significant positive difference (8 percentage points with a p-value of less than 0.001). Regarding the two youngest age strata, the only significant differences from 2000 to 2020 were positive ones among males and females aged 30 to 49 years in households with postsecondary education and diploma recipients (4 percentage points for males, with a p-value of less than 0.004; and 5 percentage points for females, with a p-value of less than 0.001), and a negative one of 14 percentage points (p-value of less than 0.04) among females aged 12 to 19 years in the second level of education.

Figure 2
Percentage of people with good vision without correction by selected age group and sex, household population aged 12 to 79, Canada, 2000/2001 cycle to 2020



Notes: Vertical bars represent 95% confidence intervals. In the x-axis, "2000" means "2000/2001."
 Source: Canadian Community Health Survey, 2000/2001 cycle to 2020.

Income quintile

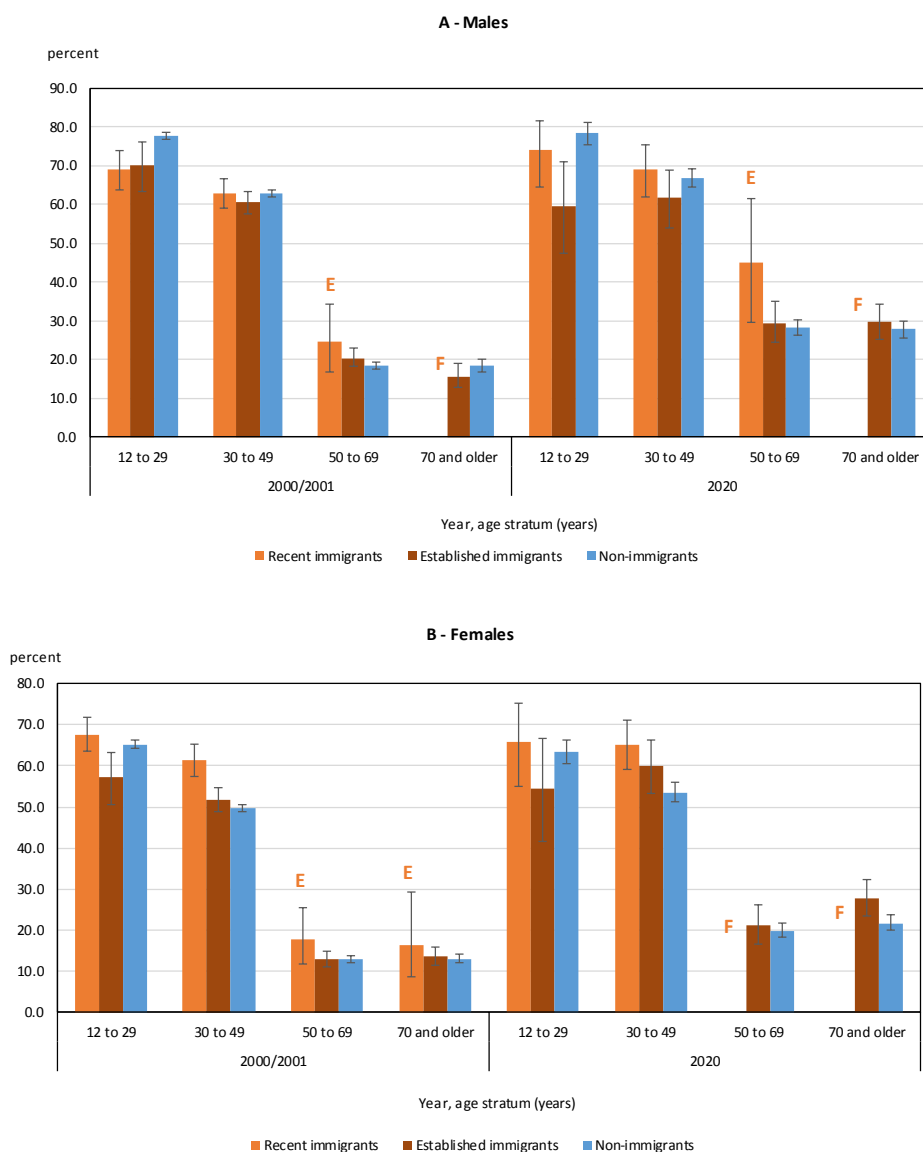
In 2020, there was no clear relationship between the household’s income quintile and the percentage of people with good vision without correction within any of the considered age strata for either sex (see Table 2). Additionally, there was no relationship between income quintile and the *variation* of this

percentage from 2005 to 2020. Indeed, only the significant variations mentioned here were observed. For males aged 12 to 29, the percentage was higher by 9 percentage points (p-value of less than 0.04) in 2020 compared with 2005 for income quintile 1, but was lower for quintile 4 (8 percentage points with a p-value of less than 0.05). For females in the same age stratum, the percentage was lower by 12 points in quintile 2 (p-value of

less than 0.02). For people aged 30 to 49 years, this percentage was higher among females of the third income quintile (8 percentage points with a p-value of less than 0.04) and the fifth income quintile (9 percentage points with a p-value of less than 0.03). For people aged 50 to 69 years, this percentage was higher in the third income quintile for males (8 percentage points with a p-value of less than 0.05) and the richest quintile for females (7 percentage points with a p-value of less than 0.02). Finally, in the oldest age group, the percentage was higher for males in income quintiles 2, 3 and 5 by at least 11

percentage points (all p-values of less than 0.02); lower for males in income quintile 4 by 7 percentage points (p-value of 0.005); and higher for females in income quintiles 1 (the poorest) and 2 (at least 6 percentage points each and both with p-values lower than or equal to 0.01). However, given that in 2005 results were to be used with caution for that age group, results on the variation should be used with caution as well.

Figure 3
Percentage of people with self-reported good vision without correction by immigrant status, age group and sex, household population aged 12 and older, Canada, 2020



E use with caution (the colour corresponds to the immigrant status)
 F too unreliable to be published (the colour corresponds to the immigrant status)
 Note: Vertical bars represent 95% confidence intervals.
 Source: Canadian Community Health Survey, 2000/2001 and 2020.

Table 1
Percentage of people with self-reported good vision without correction by highest level of education in the household, age and sex, household population aged 12 and older, Canada, 2000/2001 to 2020

Sex, year and age strata	Lower than high school			High school diploma			Postsecondary education and diploma		
	%	95% confidence interval		%	95% confidence interval		%	95% confidence interval	
		from	to		from	to		from	to
Males									
2000 to 2001									
12 to 29	82.7	79.4	85.5	80.7	78.3	83.0	75.5	74.3	76.7
30 to 49	65.1	61.5	68.4	66.3	63.8	68.6	61.6	60.6	62.7
50 to 69	18.8	16.9	20.9	16.1	13.9	18.6	19.5	18.4	20.7
70 and older	19.9	17.9	22.1	14.3	11.3	18.1	17.0	14.9	19.3
2020									
12 to 29	83.3	66.8	92.5	80.5	73.3	86.1	75.7	72.6	78.5
30 to 49	72.6	54.2	85.6	71.4	64.7	77.3	65.7	63.2	68.2
50 to 69	20.4	15.7	26.0	27.6	23.3	32.4	29.7	27.5	32.1
70 and older	30.8	25.8	36.3	24.8	20.6	29.6	28.6	26.2	31.2
Variation between 2000/2001 and 2020									
12 to 29	0.6	-12.6	13.8	-0.3	-7.1	6.6	0.2	-3.0	3.4
30 to 49	7.6	-8.5	23.6	5.1	-1.6	11.9	4.1 [†]	1.4	6.8
50 to 69	1.5	-4.0	7.1	11.5 [†]	6.4	16.7	10.2 [†]	7.7	12.8
70 and older	10.9 [†]	5.2	16.5	10.5 [†]	4.8	16.1	11.7 [†]	8.4	15.0
Females									
2000 to 2001									
12 to 29	73.5	70.1	76.6	68.3	65.6	70.9	63.9	62.8	65.1
30 to 49	55.7	52.0	59.3	50.8	48.4	53.2	50.8	49.8	51.8
50 to 69	10.4	9.1	11.7	13.7	11.8	15.9	13.5	12.6	14.5
70 and older	12.2	10.8	13.7	13.9	11.3	17.0	14.3	12.7	16.0
2020									
12 to 29	74.5	60.0	85.0	57.2	46.9	66.9	63.4	60.3	66.3
30 to 49	50.6	36.9	64.3	56.9	49.5	64.0	56.3	54.0	58.6
50 to 69	14.8	10.2	21.0	15.1	12.6	17.9	21.4	19.5	23.4
70 and older	22.8	18.9	27.1	24.5	20.8	28.5	24.5	22.1	27.1
Variation between 2000/2001 and 2020									
12 to 29	0.9	-12.0	13.9	-11.1 [†]	-21.4	-0.8	-0.6	-3.8	2.7
30 to 49	-5.0	-19.2	9.2	6.1	-1.5	13.8	5.5 [†]	3.0	8.0
50 to 69	4.4	-1.1	10.0	1.4	-2.0	4.7	7.9 [†]	5.7	10.1
70 and older	10.5 [†]	6.2	14.9	10.6 [†]	5.8	15.4	10.2 [†]	7.2	13.3

[†] variation significantly different from 0.

Source: Canadian Community Health Survey, 2000/2001 to 2020.

Discussion

The decreasing trend by age in the proportion of people with self-reported good vision without correction is observed every year for both sexes in this study. Results show that vision deteriorates around the ages of 40 to 44 years. This can be explained in part because of changes in the curvature of the cornea, which “result in remarkable changes in the quality of the retinal image.”¹¹ Self-reported eye health was weaker among females than among males. It improved for each age group between the beginning and end of the study, except for males aged 20 to 24 years and females aged 20 to 29 years. In 2020, the percentage of people with good vision without correction in the youngest age group (12 to 19 years) was about 80% among males and 70% among females; after 50 years of age, it was between 20% and 30%.

The curve of people with a corrected vision problem is practically the inverse of that of good vision without correction, since having an uncorrected vision problem is rare, except among the oldest age group. Schieber¹¹ cites an American study that states that 1 out of 28 adults (about 3.5%) is visually impaired, which is consistent with the present study’s results for

uncorrected vision problems. This study is also consistent with two of the Canadian studies mentioned in the introduction: Millar⁶ found that 4% people aged 65 years and older have “uncorrected problems,” and Aljied et al.⁸ found that 6% people aged 45 years and older have “vision impairment,” whereas this study shows that 4.5% of people aged 65 years and older have an “uncorrected vision problem.”

Regarding the oldest age groups, several studies show that visual problems become more frequent with age. Chader and Taylor¹² mention the following problems: dry eyes, cataracts (opacification of crystalline), glaucoma (progressive lesion of the optic nerve, which leads to irreversible loss of sight), maculopathy (which becomes age-related macular degeneration), eye complications related to diabetes and low vision. These eye problems are qualified as “uncorrected” because they cannot be corrected with lenses. However, some of them are correctable by other means: cataracts are reversible with a surgery and glaucoma can be controlled with medication if detected soon enough.

In 2020, none of the three analyzed social determinants of health had a clear relationship with the percentage of people with self-reported good vision without correction.

- Immigrant status: The fact that, for people aged 12 to 69 years, the highest value of that percentage in 2020 is found among recent immigrants may be an illustration of the healthy immigrant effect, in which the health of an immigrant is better than that of their non-immigrant peers, but deteriorates as the length of their stay in their new country increases.¹³ Compared with 2000, percentages in 2020 were significantly higher in most sex, age and immigrant status strata combinations.
- Education: The percentage of people with self-reported good vision without correction presents an ambiguous relationship with level of household education. It decreases with the level of education for the two youngest age strata for males, but increases for the two oldest age strata among females. However, none of these gradients are significant. Compared with 2000, the 2020 percentages were significantly higher for most sex, age and education level strata combinations.
- Household income: The percentage of people with self-reported good vision without correction is similar

in all income quintiles in 2020, contrary to the findings of Jaggernath et al.⁵ However, these authors examined this question around the world and with measured data and thus their results are not comparable to the ones found for this study. In this study, variations from 2000 to 2020 were uninformative: only about 60% of all sex, age and income quintile strata combinations showed a positive variation.

Compared with the CLSA,⁸ this study presents several differences, which make the comparison of results more challenging. A strength of the CLSA was that visual acuity was measured by a trained assessor, whereas in the CCHS, eye health – like all other variables – is self-reported. Other differences between the surveys represent relative advantages for this study over the CLSA. First, the CCHS uses national data (instead of data collected in 11 urban areas in 7 provinces) on a population aged 12 years and older (instead of people aged 45 to 85 years old). Second, the CCHS data span over 20 years, compared with a unique collection of 4 years for the CLSA.

Table 2
Percentage of people with self-reported good vision without correction by household income quintile, age and sex, household population aged 12 and older, Canada, 2005 and 2020

Sex, year and age strata	Quintile 1 (the poorest)			Quintile 2			Quintile 3			Quintile 4			Quintile 5 (the richest)		
	%	95% confidence interval		%	95% confidence interval		%	95% confidence interval		%	95% confidence interval		%	95% confidence interval	
		from	to		from	to		from	to		from	to		from	to
Males															
2005															
12 to 29	69.2	61.6	75.8	76.7	69.7	82.4	80.6	74.1	85.9	82.0	76.2	86.5	84.2	78.6	88.5
30 to 49	61.6	53.4	69.1	61.1	54.4	67.5	66.9	60.4	72.8	67.0	61.0	72.6	59.6	53.2	65.7
50 to 69	23.9	17.3	32.2	31.8	23.9	40.9	22.5	16.5	29.9	27.0	20.5	34.7	22.9	18.5	28.0
70 and older	19.6	14.0	26.6	17.3 ^E	12.1	24.1	17.5 ^E	11.2	26.3	33.3 ^E	19.1	51.4	17.7 ^E	10.5	28.3
2020															
12 to 29	78.7	73.0	83.4	73.2	65.9	79.4	75.8	69.5	81.1	74.1	67.9	79.4	78.2	71.3	83.9
30 to 49	68.2	62.3	73.6	67.3	61.6	72.5	66.4	61.1	71.3	64.9	59.8	69.8	67.1	62.2	71.7
50 to 69	26.9	22.2	32.1	31.0	26.7	35.7	30.8	26.3	35.6	29.7	25.4	34.3	27.2	23.4	31.4
70 and older	25.7	21.4	30.4	27.9	24.1	32.0	30.4	26.0	35.1	26.6	21.8	32.1	31.0	25.3	37.3
Variation between 2005 and 2020															
12 to 29	9.5 [†]	0.7	18.3	-3.5	-12.8	5.8	-4.8	-13.1	3.4	-7.9 [†]	-15.6	-0.1	-5.9	-13.9	2.1
30 to 49	6.7	-3.0	16.4	6.2	-2.3	14.7	-0.5	-8.6	7.5	-2.1	-9.7	5.6	7.5	-0.3	15.3
50 to 69	2.9	-6.0	11.9	-0.7	-10.4	8.9	8.2 [†]	0.1	16.4	2.7	-5.7	11.1	4.3	-1.9	10.5
70 and older	6.1	-1.6	13.8	10.6 ^{†,E}	3.4	17.8	12.9 ^{†,E}	4.1	21.7	-6.7 ^E	-23.6	10.3	13.3 ^{†,E}	2.6	24.0
Females															
2005															
12 to 29	62.9	56.5	69.0	68.3	60.4	75.2	71.0	64.4	76.8	67.2	59.7	73.9	67.1	56.7	76.1
30 to 49	56.3	49.3	63.0	56.0	49.6	62.2	50.7	44.5	56.8	50.5	44.4	56.6	47.1	41.3	52.9
50 to 69	17.1 ^E	11.0	25.5	14.2	10.3	19.2	23.4	17.7	30.1	16.9	12.4	22.4	13.4	9.9	17.8
70 and older	16.0	12.3	20.4	9.5 ^E	6.4	13.9	20.4 ^E	12.9	30.7	18.5 ^E	9.5	32.9	F
2020															
12 to 29	62.6	56.3	68.5	55.8	49.0	62.4	64.8	58.8	70.3	66.1	59.7	71.9	66.5	59.8	72.7
30 to 49	55.2	50.4	59.9	57.2	52.2	62.1	58.9	54.4	63.4	53.7	49.3	58.0	55.9	50.8	60.8
50 to 69	23.6	19.4	28.4	18.7	15.4	22.4	17.8	14.4	21.7	20.5	16.8	24.9	20.4	17.0	24.3
70 and older	22.3	19.4	25.6	23.5	20.5	26.7	23.8	19.9	28.3	24.5	19.8	29.9	29.6	23.4	36.5
Variation between 2005 and 2020															
12 to 29	-0.3	-9.1	8.4	-12.5 [†]	-22.4	-2.5	-6.2	-14.7	2.3	-1.1	-10.4	8.2	-0.6	-12.3	11.1
30 to 49	-1.0	-9.4	7.3	1.2	-6.8	9.2	8.3 [†]	0.6	15.9	3.2	-4.3	10.7	8.8 [†]	1.2	16.5
50 to 69	6.6 ^E	-2.0	15.1	4.5	-1.2	10.1	-5.6	-12.7	1.6	3.7	-2.8	10.1	7.1 [†]	1.7	12.4
70 and older	6.4 [†]	1.3	11.4	14.0 ^{†,E}	9.1	18.9	3.4 ^E	-6.4	13.3	6.0 ^E	-6.7	18.7	F

... not applicable

E use with caution

F too unreliable to be published

† variation significantly different from 0

Source: Canadian Community Health Survey, 2005 and 2020.

The limitations of this study are those of any study where data are self-reported, as is the case for the CCHS. Also, in 2015, this survey underwent major modifications related to the measured variables, representativeness of provinces and mode of collection,¹⁴ among other things. This could impact the comparability of the results before and after 2015. Indeed, according to the survey developers, “caution should be taken when comparing estimates across those years [before and after the redesign of 2015]. Even estimates derived from content that has remained unchanged, are subject to the potential impacts of the other major changes to the survey [...] and may not be necessarily comparable with past cycles.”¹⁴ This constraint seems critical to the study’s validity. However, the trend observed from 2000 to 2014 extended into 2015 to 2020 with no discontinuity, reinforcing the conclusion that eye health has

generally improved from 2000 to 2020. Additionally, data in 2020 may have a bias as a result of a higher rate of non-response because of the COVID-19 pandemic, but for this year, no discontinuity was observed.

The CCHS is a rich source of data; however, it is limited by the fact that there are no recent questions about access to eye specialists, measured eye refraction (as opposed to self-reported) and the utilization of electronic devices. For such variables, future research could use other data sources such as the Canadian Health Measures Survey so that, despite the smaller sample, a comparison of measured variables on eye health with self-reported measures of eye health could be performed.

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